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U.S. Department of the Interior • U.S. Geological Survey

# MINERAL INDUSTRY SURVEYS

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## TITANIUM IN THE SECOND QUARTER 1997

### Ores and Concentrates

BHP Minerals commissioned its Beenup, Australia, ilmenite operations. According to the company, 50% of Beenup's initial ilmenite production will be used as the feedstock for the BHP-Tinfos joint venture slag operation in Tyssedal, Norway. At full production, the Tyssedal joint venture is expected to produce 200,00 metric tons of chloride-grade slag and 40,000 tons of sulfate-grade slag (BHP Minerals Global Report, 1997).

RGC Ltd. discovered several new mineral sands deposits in Victoria, Australia. However, exploration efforts currently focus on the Kulwin and Woornack deposits. Initial drilling results indicate grades averaging between 3% and 16% heavy minerals. RGC has been granted tenements over 44,000 square kilometers of the Murray basin (Industrial Minerals, 1997).

### Metal

According to the U.S. Geological Survey, receipts of titanium scrap totaled 8,770 tons with 4,000 tons of home scrap and 4,770 tons of purchased scrap. Scrap receipts decreased 13% compared with those of the previous quarter. Ingot shipments were 6,180 tons.

The Alta Group suspended operations at its Salt Lake City, UT, sponge plant for safety checks and repairs following a sodium fire. According to news reports, safety features failed when a sodium tank was being filled, causing sodium to leak into a nearby containment trench. Moisture in the trench ignited the sodium resulting in a fire. Several tanks containing acetylene outside the building exploded shortly thereafter. Six people were treated for inhaling toxic fumes and the surrounding area was evacuated. Subsequent air quality checks revealed no hazards, and the building was reported to have sustained minimal damage. The 340-ton-per-year titanium sponge plant was commissioned in 1996 and produces feedstock for electronic-grade, high-purity, titanium (Deseret News, 1997).

RMI Titanium Co. announced an agreement with Galt Alloys, Inc. to acquire 90% of the common stock of Galt. As a result of the agreement, Galt is undertaking an expansion program which will include a new scrap preparation facility, a plasma consolidation furnace, and a plasma hearth furnace. Currently, Galt produces ferrotitanium and specialty alloys (RMI Titanium Co., 1997).

### Pigment

E. I. du Pont de Nemours and Co. (DuPont) announced it agreed to acquire several of Imperial Chemical Industries PLC (ICI) businesses including ICI's white pigment business outside of North America. Under the agreement, DuPont will acquire ICI subsidiary Tioxide's titanium pigment facilities in France, Italy, Spain, the United Kingdom, South Africa, and Malaysia. However, Tioxide's 50% interest in Louisiana Pigment Co., Lake Charles, LA, and its finishing operations in Quebec, Canada, are not included in the acquisition (E. I. du Pont de Nemours and Co., 1997). According to ICI, options are being developed for the disposal of its North American titanium dioxide businesses (Imperial Chemical Industries PLC, 1997).

According to industry reports, DuPont plans to idle its 36,000-ton-per-year pigment plant at Antioch, CA. However, finishing and slurry operations at the Antioch facility are expected to remain on-stream. The Antioch pigment plant was opened in 1963 using DuPont's original chloride process technology (European Chemical News, 1997).

In April, Kemira Pigments B.V. brought its Rotterdam, Netherlands, pigment facility back on-stream. An explosion in January had halted production at the 56,000-ton-per-year chloride route facility (Kemira Pigments Oy B.V., 1997).

Millennium Chemicals Inc. announced titanium pigment producer SCM Chemicals Inc. has changed its name to Millennium Inorganic Chemicals Inc. Millennium Chemicals Inc. was formed in 1996 as a result of a spin-off from Hanson

PLC (Millennium Inorganic Chemicals Inc., 1997).

### Notice

Excluding prices, the data in this publication have been rounded to three significant figures.

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TABLE 1  
COMPONENTS OF U.S. TITANIUM METAL SUPPLY AND DEMAND 1/

(Metric tons)

	1996				1997		
	Second quarter	Third quarter	Fourth quarter	Year to date	First quarter	Second quarter 2/	Year to date
Production:							
Sponge	W	W	W	W	W	W	W
Ingot	13,000	13,000	13,100	51,400	13,800	14,500	28,300
Mill products	7,690	8,000	7,860	30,700	8,330	8,040	16,400
Exports:							
Sponge	62	136	243	528	198	199	397
Scrap	600	1,080	1,190	3,410	1,010	653	1,660
Ingot, slab, sheet bar, etc.	1,080	918	1,180	3,120	1,140	686	1,830
Other unwrought	111	110	133	471	88	31	118
Bars, rods, profiles, and wire	332	294	255	1,400	301	227	527
Other wrought	1,010	716	674	3,130	893	627	1,520
Total	3,190	3,250	3,670	12,100	3,630	2,420	6,050
Imports:							
Sponge	2,010	2,460	3,160	10,100	3,830	2,790	6,620
Waste and scrap	4,130	4,180	3,840	16,400	2,000	2,210	5,530
Ingot, billet	309	752	1,090	2,590	1,130	817	1,950
Other unwrought	132	204	152	595	116	36	152
Articles of titanium	108	57	38	261	65	26	91
Other wrought (mill products)	1,000	1,800	1,760	5,890	1,420	740	2,160
Total	7,690	9,450	10,000	35,800	8,550	6,620	16,500
Stocks, end of period:							
Sponge, Government 3/	33,400	33,400	33,200	XX	33,200	33,200	XX
Sponge, Industry	5,500	4,000	4,390	XX	5,250	5,670	XX
Scrap	10,100	15,400	15,900	XX	16,400	15,300	XX
Ingot	3,940	3,970	4,710	XX	4,310	4,330	XX
Total industry	19,600	23,300	25,000	XX	25,900	25,300	XX
Consumption:							
Sponge	6,310	8,570	6,850	28,400	6,890	8,300	15,200
Scrap	6,130	6,740	7,320	26,300	6,620	6,770	13,400
Ingot	9,970	9,420	9,920	38,300	10,500	11,400	21,900
Mill products (net shipments):	6,110	6,960	6,840	25,900	6,780	6,570	13,300
Forging and extrusion billet	2,330	3,380	3,200	11,200	3,040	3,000	6,040
Rod and bar	981	670	793	3,100	736	795	1,530
Other 4/	2,800	2,910	2,850	11,600	3,000	2,770	5,770
Castings (shipments)	169	139	144	680	138 r/	197	335

r/ Revised. W Withheld to avoid disclosing company proprietary data. XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Imports and exports for second quarter 1997 include April and May only. June 1997 data not available at time of publication. Production and consumption data are for full quarter.

3/ Includes 23,300 tons stockpile grade and 9,860 tons nonstockpile grade material.

4/ Data for sheet and strip, plate, fastener stock and wire, extrusions (other than tubing), pipe and tubing, and other have been combined to avoid disclosing company proprietary data.

TABLE 2  
COMPONENTS OF U.S. TITANIUM DIOXIDE PIGMENT SUPPLY AND DEMAND 1/

(Metric tons)

	1996				1997		
	Second quarter	Third quarter	Fourth quarter	Year to date	First quarter	Second quarter	Year to date
Production	307,000	304,000	320,000	1,230,000	316,000	342,000	657,000
Imports 2/	41,000	42,000	30,700	155,000	56,500	NA	NA
Exports 3/	75,300	83,000	97,400	332,000	103,000	NA	NA
Stocks, end of period	116,000	98,300	107,000	XX	97,300	94,000	XX
Apparent consumption 4/	285,000	281,000	245,000	1,200,000	278,000	NA	NA

NA Not available. XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Based on Harmonized Tariff Schedule of the United States (2823.00.0000, 3206.10.0050, and 3206.10.0010).

3/ Based on Harmonized Tariff Schedule of the United States (2823.00.0000 and 3206.10.0000).

4/ Apparent consumption = production + imports - exports - stock increase or + stock decrease.

Source: Bureau of the Census.

TABLE 3  
U.S. EXPORTS OF TITANIUM PRODUCTS 1/

(Metric tons)

	1996				1997		
	Second quarter	Third quarter	Fourth quarter	Year to date	First quarter	April-May	Year to date
Metal:							
Unwrought:							
Sponge	62	136	243	528	198	199	397
Scrap	600	1,080	1,190	3,410	1,010	653	1,660
Billet	88	85	186	489	135	156	291
Blooms and sheet bars	943	802	911	3,060	877	436	1,310
Ingot	50	31	78	269	132	94	226
Other unwrought	111	110	133	471	88	31	118
Wrought:							
Bars, rods, profiles, and wire	332	294	255	1,400	301	227	527
Other	1,010	716	674	3,130	893	627	1,520
Ores and concentrates	5,630	6,050	722	15,500	7,510	475	7,990
Oxides	7,730	11,300	13,200	40,600	9,550	6,870	16,400
Pigments	67,600	71,600	84,200	292,000	93,700	64,700	158,000

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: Bureau of the Census.

TABLE 4  
U.S. IMPORTS FOR CONSUMPTION OF TITANIUM METAL 1/

(Metric tons)

	1996				1997		
	Second quarter	Third quarter	Fourth quarter	Year to date	First quarter	April- May	Year to date
Unwrought:							
Sponge:							
China	176	274	304	833	214	124	338
Japan	891	1,200	1,470	4,400	1,770	1,040	2,810
Kazakstan	45	330	485	920	465	105	570
Russia	644	583	896	3,570	1,230	1,180	2,400
Other	256	71	4	379	147	350	496
Total	2,010	2,460	3,160	10,100	3,830	2,790	6,620
Waste and scrap:							
Canada	101	106	111	409	53	23	86
France	251	181	187	848	177	152	457
Germany	182	204	33	559	16	198	250
Italy	233	330	407	1,380	132	396	674
Japan	692	717	720	2,620	266	375	853
Russia	1,390	1,160	987	5,490	590	454	1,340
United Kingdom	861	1,140	1,110	3,770	610	482	1,370
Other	419	345	285	1,300	154	131	493
Total	4,130	4,180	3,840	16,400	2,000	2,210	5,530
Ingot and billet:							
France	5	--	--	30	--	--	--
Japan	3	19	3	67	16	8	24
Kazakstan	--	--	--	91	--	--	--
Russia	240	402	725	1,550	768	557	1,330
United Kingdom	62	218	270	635	202	195	397
Other	--	113	90	221	143	57	200
Total	309	752	1,090	2,590	1,130	817	1,950
Powder	36	88	77	240	60	34	93
Other 3/	96	116	75	355	56	2	57
Wrought:							
Articles of titanium:							
Castings	1	1	1	4	1	1	2
Other	107	56	37	257	64	25	89
Other wrought (mill products):							
Bars, rods, profiles, and wire	187	427	682	1,710	666	271	937
Plates, sheets, strips, and foil	746	1,050	915	3,490	447	246	693
Tubes and pipes	59	82	51	311	7	6	12
Other	9	241	114	374	297	217	514
Total mill products	1,000	1,800	1,760	5,890	1,420	740	2,160

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Less than 1/2 unit.

3/ Includes blooms, sheet bars, slabs, and other.

Source: Bureau of the Census.

TABLE 5  
U.S. IMPORTS FOR CONSUMPTION OF TITANIUM CONCENTRATES 1/

(Metric tons)

	1996				1997		
	Second quarter	Third quarter	Fourth quarter	Year to date	First quarter	April- May	Year to date
Ilmenite:							
Australia	58,000	68,900	143,000	359,000	105,000	79,500	184,000
India	34,200	--	--	114,000	26,200	--	26,200
Sri Lanka	--	29,400	--	29,400	--	--	--
Ukraine	--	--	--	15,800	--	--	--
Total	92,200	98,400	143,000	518,000	131,000	79,500	210,000
Titanium slag:							
Canada	4,790	--	--	11,500	30,400	--	30,400
South Africa	108,000	115,000	145,000	410,000	45,700	53,000	98,600
Other	2	--	--	2 2/	--	--	--
Total	113,000	115,000	145,000	421,000	76,100	53,000	129,000
Rutile:							
Australia	8,080	5,410	14,700	46,000	4,580	3,990	8,570
South Africa	37,700	41,100	23,400	135,000	31,900	28,400	60,400
Other	843	337	3	1,180 2/	--	8	8
Total	46,600	46,800	38,200	182,000	36,500	32,400	69,000
Synthetic rutile:							
Australia	19,100	41,000	13,300	108,000	31,400	25,000	56,400
Malaysia	1,140	3,810	--	6,850	456	2,660	3,120
Other	--	27,200	--	27,200 2/	--	--	--
Total	20,200	71,900	13,300	142,000	31,800	27,700	59,500
Titaniferous iron ore:							
Canada	36,200	15,000	38,800	90,200	69	12,200	12,300

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Data under review.

Source: Bureau of the Census.

TABLE 6  
U.S. IMPORTS FOR CONSUMPTION OF TITANIUM PIGMENTS 1/

(Metric tons)

	1996				1997		
	Second quarter	Third quarter	Fourth quarter	Year to date	First quarter	April- May	Year to date
80% or more titanium dioxide:							
Canada	16,300	17,600	17,600	64,900	18,800	12,400	31,300
China	316	120	131	771	154	393	546
Finland	214	223	155	966	156	35	192
France	718	711	650	2,830	744	454	1,200
Germany	3,470	4,490	3,060	14,500	6,290	4,040	10,300
Japan	1,170	916	866	4,210	1,360	1,340	2,700
Norway	1,390	1,390	928	5,410	1,890	999	2,890
Poland	--	20	100	940	388	160	548
Singapore	1,090	1,170	939	4,030	1,140	361	1,500
Slovenia	198	375	306	1,450	241	555	796
United Kingdom	121	1	19	202	58	79	137
Other	696	911	1,110	3,640	848	881	1,730
Total	25,700	27,900	25,900	104,000	32,100	21,700	53,800
Other titanium dioxide:							
Canada	186	210	201	989	217	433	650
France	1,440	2,250	2,950	9,780	2,370	742	3,120
Germany	276	342	225	1,330	260	234	494
South Africa	1,910	1,390	1,270	5,790	1,900	1,970	3,880
Spain	2,910	4,220	4,660	13,900	4,670	2,390	7,050
United Kingdom	1,420	631	671	3,540	1,130	740	1,870
Other	971	585	894	4,100	816	829	1,650
Total	9,110	9,640	10,900	39,400	11,400	7,340	18,700

See footnotes at end of table.

TABLE 6--Continued  
U.S. IMPORTS FOR CONSUMPTION OF TITANIUM PIGMENTS 1/

(Metric tons)

	1996				1997		
	Second quarter	Third quarter	Fourth quarter	Year to date	First quarter	April-May	Year to date
Titanium oxide:							
Belgium	607	637	389	2,290	621	450	1,070
Canada	245	--	109	2,930	--	--	--
France	1,870	888	936	5,230	3,290	1,770	5,060
Germany	2,300	1,890	2,570	8,230	1,280	508	1,780
Japan	281	142	198	1,180	211	108	319
United Kingdom	61	80	541	742	141	120	261
Other	814	789	775	2,900	998	822	1,820
Total	6,180	4,430	5,520	23,500	6,540	3,780	10,300
Grand total	41,000	42,000	30,700	155,000	50,000	32,900	82,800

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: Bureau of the Census.

TABLE 7  
PUBLISHED PRICES OF TITANIUM MATERIALS

(End of period, Second quarter 1997)

Specification of material	Range
Ilmenite, per metric ton:	
F.o.b. Australian ports	\$77 - \$88
Titanium slag, per metric ton: 1/	
80% TiO <sub>2</sub> , Canada	340
85% TiO <sub>2</sub> , South Africa	231
Rutile, per metric ton:	
Natural:	
Bagged, f.o.b. Australian ports	650 - 730
Bulk, f.o.b. Australian ports	500 - 560
Sponge metal, per pound:	
Estimated, domestic	4.25 - 4.50
Titanium scrap, per pound:	
Turnings, unprocessed (Ti-6Al-4V)	.70 - .75
Ferrotitanium, per pound:	
70% (max. 4.5% Al) per pound Ti	1.92 - 1.97
Titanium dioxide pigment, per pound:	
Anatase, f.o.b. U.S. plants, list price	.90 - .94
Rutile, f.o.b. U.S. plants, list price	.92 - .94

1/ Estimated based on U.S. imports for consumption.

Sources: American Metal Market, Chemical Market Reporter, Industrial Minerals (London), Platt's Metals Week, and industry contacts.